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L9: Entry 2 of 2 File: DWPI Mar 3, 1995

DERWENT-ACC-NO: 1995-135432
DERWENT-WEEK: 199518

TITLE: Image reading device for reading two sides of original document - incorporates optimum preprocessing circuit with preprocessing selection facility for document images multiple reading units

PATENT-ASSIGNEE: CANON KK (CANO)

PRIORITY-DATA: 1993JP-0223890 (August 17, 1993)

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PATENT-FAMILY:

	PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
☐	JP 07058945 A	March 3, 1995		011	H04N001/387

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 07058945A	August 17, 1993	1993JP-0223890	

INT-CL (IPC): H04 N 1/387; H04 N 1/403

ABSTRACTED-PUB-NO: JP 07058945A
BASIC-ABSTRACT:

The image device includes CCD units. The document image is read by multiple CCD sensors which pickup surface image and under surface image (3-6). The image composition circuit (7) combines one line each of upper surface and under surface and generate a single line signal. The image signal is digitised by an A/D convertor (8). The image data thus obtained is preprocessed before compression. Two or more types of encoding method are applied to the image data. A selector (9) carries out optimum preprocessing.

ADVANTAGE - Improves encoding compression rate. Eliminates image frame memory. Reduces device size and cost. Increases clarity of reproduced image.

ABSTRACTED-PUB-NO: JP 07058945A
EQUIVALENT-ABSTRACTS:

CHOSEN-DRAWING: Dwg.1/8

DERWENT-CLASS: W02
EPI-CODES: W02-J03A1; W02-J03A2B; W02-J03B;

PATENT ABSTRACTS OF JAPAN

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H04N 1/403

(21)Application number : **05-223890**

(22)Date of filing : **17.08.1993**

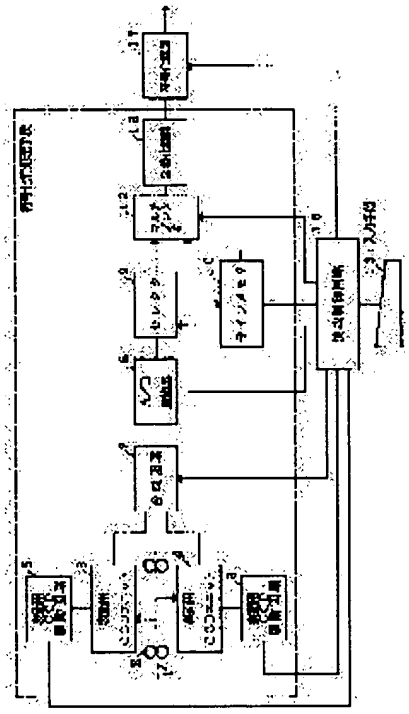
(71)Applicant : **CANON INC**

(72)Inventor : **INOUE TAKASHI**

(54) IMAGE READER

(57)Abstract:

PURPOSE: To provide an image reader capable of performing the optimum image processing on both surface and back planes without adding a compression encoder circuit and image memory as the image reader which reads the front and rear surfaces of a document by a CCD by a single operation and converts information into a digital value by A/D conversion and performs binarization and encoding.



CONSTITUTION: This reader is provided with an image data synthesis circuit 7 which synthesizes image data on the surface and the rear surface read by plural CCDs 3, 4 at every line alternately and forms one piece of continuous image data setting one surface line and one rear surface line as a pair, a selection circuit which selects the optimum pre-processing method for the surface and the rear surface, respectively independently from plural kinds of image data pre-processing methods performed before compression encoding for reading resolution or binarization processing, etc., based on the distribution frequency of the kind of image data on the front and rear surfaces of the document (character data, gradation data, multiple edge data, etc.).

LEGAL STATUS

[Date of request for examination]

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[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] The image reader characterized by to establish a pretreatment selection means choose the optimal pretreatment means to the manuscript which reads a manuscript with two or more read means constituted by the image sensor, changes the read signal into digital value with an A/D converter, is equipped with two or more kinds of image-data pretreatment means performed before coding in the image reader which performs binary-izing and coding, and reads for two or more of said read means of every.
[Claim 2] It is the image reader characterized by the pretreatment means before said coding being the read resolution at the time of manuscript read in claim 1.
[Claim 3] It is the image reader characterized by the pretreatment means before said coding being binary-ized mode of processing at the time of manuscript read in claim 1.
[Claim 4] It is the image reader characterized by the pretreatment means before said coding being both the read resolution at the time of manuscript read, and binary-ized mode of processing in claim 1.
[Claim 5] The image reader characterized by establishing an image merge means to compound the image data obtained by said two or more read means for every line in claim 1, and to output to a coding means as one continuous image data.
[Claim 6] The image reader characterized by said two or more read means being read means to read the front face and rear face of a manuscript, respectively in claim 1.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to image data processing in the image reader which reads front flesh-side both sides of a manuscript using the image sensors which perform photo electric conversion.
[0002]
[Description of the Prior Art] In order to read front flesh-side both sides of a manuscript by one actuation conventionally using an image sensor like a CCD linear sensor, two or more read means are established and the obtained table and the image reader which carries out compression coding of the image data of each flesh side are offered.
[0003]
[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional example, for example on the surface of a manuscript, many image data of halftone like a photograph exists, and if pretreatment means, such as resolution of read and a binary-ized method, are decided according to surface image data when reading the manuscript with which only binary image data like an alphabetic character exists, the same resolution also as read and a binary-ized method on the back will be applied to a rear face. For this reason, since resolution is high to the read of alphabetic character image data on the back beyond the need, the amount of data increases to it and improvement in coding speed and compressibility is not made to it in subsequent compression coding.
[0004] Moreover, since binary-ization in consideration of reappearance of halftone without the need is performed to the read of alphabetic character image data on the back, the amount of data increases and improvement in coding speed and compressibility cannot be performed in subsequent compression coding.
[0005] Moreover, in the above-mentioned example, if pretreatment means, such as resolution of read and a binary-ized method, are decided according to alphabetic character image data on the back, since the same surface resolution also as read and a surface binary-ized method are applied and binary-ization which resolution was low and took reappearance of halftone into consideration will be performed to the read of surface halftone image data, when a surface image is reproduced, image quality deteriorates greatly.
[0006] Moreover, completely establish independently separately a pretreatment means to determine resolution and a binary-ized method, with a front face and the rear face from a read means, and it also sets to the equipment which solved the above-mentioned problem. Only by compounding simply by turns the image data of the front face separately obtained at the time of the input of a compression coding means, and a rear face for every line, the data in front of one line of a front face will be called the data on the back for one line, and the correlation for every Rhine will completely be lost.
[0007] therefore, like a run-length-coding method called MRMMR currently widely used with current facsimile apparatus etc. By the method which makes Rhine in front of one reference, and is encoded, Rhine which should be encoded In order to be unable to perform compression coding but to carry out,

[whether the object for front faces and two compression coding means for rear faces are also established separately, and] Or image memory which memorizes the image data of the front face of a manuscript or a rear face by the whole surface was needed, and there was a fault that caused a cost rise or the miniaturization of equipment was barred.

[0008] Then, this invention aims at offering the image reader which can perform the optimal image processing to front flesh-side both sides, without extending a compression coding means and an image memory.

[0009]

[Means for Solving the Problem] In the image reader which this invention reads front flesh-side both sides of a manuscript with an image sensor like CCD series, changes into digital value with an A/D converter by one actuation, and performs binary-izing and coding Each image data of the front face obtained by two or more read means and a rear face is compounded by turns the whole line. The image merge means which the table of one line and the flesh side of one line make one continuous image data by the pair is established. Out of the image data pretreatment means performed before compression [read and] coding with which two or more kinds were established, such as resolution and binary-ized processing At the time of manuscript read, with the distribution frequency of the image kinds of data (alphabetic data, gradation data, multi-edge data, etc.) of the front face and rear face of a manuscript, with a front face and the rear face By having established a means to choose pretreatment means, such as separately optimal respectively resolution and binary-ized processing, with the front face and rear face of a manuscript Since read is performed by the optimal resolution for each field, and binary-ized processing even if it reads both sides by one actuation when the distribution frequency of an image kind of data is greatly different, The problem of the increment in the amount of data useless beyond the need and degradation of image quality is lost, and improvement in coding compressibility can be aimed at in the compression coding means established henceforth.

[0010] Moreover, since the image data of the front face of one line and the rear face of one line is compounded as image data which the pair followed and is treated as one image data, In compression coding prepared henceforth, without holding the correlation in every line which becomes important in compression coding, and needing special image memory even when the resolution of a front face and a rear face differs from binary-ized processing Since improvement in coding compressibility is not only attained, but the optimal image reading for a front face and each rear face can be realized, without establishing resolution and two means of binary-ized processing or coding with a front face and the rear face, it becomes advantageous also in respect of the miniaturization of cost and equipment.

[0011] When recording a manuscript on media, such as an optical disk, as an image file especially, it becomes possible to raise compressibility and to output to a record medium as the optimal image data for the image kind of data of a front face and a rear face, and the image reader with which are satisfied of both playback image quality and the amount of data can be realized.

[0012]

[Example] Drawing 1 is the block diagram showing the basic configuration of one example of this invention.

[0013] In this Fig., the CCD unit 3 for front faces for surface read and the CCD unit 4 for rear faces for read on the back are formed as two reading means for reading the front face and rear face of the manuscript 1 conveyed by the conveyance means 2, respectively.

[0014] Each read units 3 and 4 are the same configurations, read horizontal scanning is performed by CCD series and vertical scanning is performed by conveyance of a manuscript 1.

[0015] Here, as for the reading station of the CCD unit 4 for rear faces, only distance L is shifted in the conveyance direction to the reading station of the CCD unit 3 for front faces. This is for preventing flesh-side reading at the time of reading a thin manuscript and the manuscript of bore nature.

[0016] The CCD drive circuit 5 for front faces and the CCD drive circuit 6 for rear faces can change separately the reading resolution of the CCD unit 3 for front faces, and the CCD unit 4 for rear faces by changing the timing of a drive clock by control of the reading control circuit 15 by giving a drive clock to the CCD unit 3 for front faces, and the CCD unit 4 for rear faces, respectively. The drive clock in the

case of changing resolution into drawing 2 and the relation of a CCD output are shown.
[0017] SH pulse as which CCD series generally determines the optical storage time for one line, As it drives by four kinds of clock pulses of phi 1 which drives the shift register inside CCD, phi2 pulse, and RS pulse which sweeps out the charge stored in the output buffer and is shown in drawing 2 (a) and (b) The output rate of CCD output data becomes half by changing the timing of RS pulse into one period at once from 1 time at the half period of phi 1 and phi2 pulse. That is, reading resolution becomes half when the same optical system is used by the same CCD.
[0018] The synthetic circuit 7 is a circuit which compounds by turns the image data of the front face of the manuscript 1 read by the surface CCD unit 3 and the CCD unit 4 for rear faces, and a rear face for every line by control of the reading control circuit 15.
[0019] Drawing 3 is the explanatory view showing the situation of the composition, drawing 3 (a) is a synthetic output wave in case a front face and rear-face both sides read a manuscript 1 in the mode in which resolution is high, and the synthetic output wave is the wave with which the image data of a table and a flesh side was located in a line by turns for every line by giving a drive SH pulse by turns to CCD of a table and a flesh side, respectively.
[0020] Moreover, by a front face performing read with high resolution, a rear face is a synthetic output wave at the time of performing read with a low resolution, and drawing 3 (b) serves as a wave by which image data on the back was alternately compounded in the state of the gear-tooth omission by giving a drive SH pulse alternately to CCD to a front face.
[0021] Drawing 3 (c) shows the synthetic output at the time of reading a front face and rear-face both sides with a low resolution. As compared with the case of drawing 3 (a), the period of the drive SH pulse given to CCD of a front face and a rear face has doubled, and a front face and a rear face serve as a wave by which image data was alternately compounded in the state of the gear-tooth omission.
[0022] In the circuit after this synthetic circuit 7, as one image, it is controlled by the image data pair for one line of the front flesh side of one manuscript by the reading control circuit 15 so that a circuit operates. Then, the image data for one line of a front face and a rear face is changed into digital value by A/D converter 8 as 1 set of image data.
[0023] Next, actuation of a selector 9 is explained.
[0024] First, to a selector 9, since the image data in every line of ******, the front face of the same manuscript, and a rear face makes a pair, is compounded and is sent to a selector 9 when the CCD unit 3 for front faces and the rear-face CCD unit 4 are performing read in the same resolution as shown in drawing 3 (a) and drawing 3 (c), the reading control circuit 15 issues an instruction so that image data may be sent to a multiplexer 12 as it is.
[0025] Next, as shown in drawing 3 (b), when the CCD unit 3 for front faces and the rear-face CCD unit 4 are performing read in different resolution and resolution of reading of a rear face is being set to one half of the resolution of reading of a front face, alternately, the image data on the back for one line will be in a gear-tooth omission condition, and will be sent to a selector 9.
[0026] The reading control circuit 15 makes the Rhine memory 10 memorize the image data for the rear face of one line according to the timing of the CCD drive SH pulse of the field where the resolution of read is low.
 [0027] Then, if the image data of the timing to which the image data for the rear face of one line lost its tooth is sent, the image data for one line of the rear face memorized by said Rhine memory 10 will be read by the reading control circuit 15, it will be sent to a multiplexer 12, and data will be compounded by the part of a gear-tooth omission.
[0028] The timing and the output of this sequence are shown in drawing 4 . Like illustration, when the resolution of reading of a front face and a rear face differs Since the image data of the field where the resolution of reading is low cannot lose its tooth, the image data for one line of a front face and a rear face cannot be made into a pair and it cannot consider as one image, The continuation image data from which it interpolated by the image data for one line which read the gear-tooth omission part of the image data of a field with the low resolution of reading just before the same field, and the image data for one line of a front face and a rear face surely became a pair by the above actuation is sent to the binary-ized circuit 13.

[0029] In the binary-ized circuit 13, the continuation image data from which the amount of [of a front face and a rear face] one line became a pair is made binary as 1 image data, and is sent to a coding network 17.
[0030] In a coding network 17, compression coding by run-length-coding method called MRMMR currently widely used by current facsimile etc. is performed. In addition, since the image data in every line of the front face and rear face of the same manuscript is compounded and it is dealt with as one pair of continuation image data, in case the signal inputted into this coding network 17 also performs compression coding, it becomes advantageous. The situation is explained in drawing 5 .
[0031] For example, as a coding method, like MR method, by the method which makes reference the image data in front of one line of the image data line which should encode, and determines a symbolic language, it is shown in drawing 5 that compressibility increases, so that correlation with the image data line in front of one line is high.
[0032] As shown in drawing 5 (a), the image data of a front face and a rear face is compounded by turns for every line, and is sent to a coding network 17, but by the coding network 17, if the data for every front face and each of rear face of one line are separately encoded as shown in drawing 5 (b), when encoding a part for "table of B"1 line, the data in front of one line to refer to will turn into data for "flesh side of A"1 line, for example.
[0033] Therefore, since there is no correlation in the data for "table of B"1 line, and the data for "table of A"1 line in any way as image data, a symbolic language is set to "001 000111 010001 000111 010."
[0034] Moreover, when encoding a part for "table of B"1 line if the data in every line of a front face and a rear face are encoded as 1 image data by the pair as shown in drawing 5 (c), the data in front of one line to refer to turn into data for "table of A"1 line. Therefore, correlation is high to the data for "table of A"1 line, and the data for "table of B"1 line as image data, and a symbolic language becomes the easy thing "1 1 1 1" to them.
[0035] As mentioned above, coding with high compressibility is attained by making the data in every line of a front face and a rear face into a pair, and encoding as 1 image data.
[0036] As explained above, in this example, two read means to read the front face and rear face of a manuscript, respectively are established. With a means to establish a means to compound by turns the image data in every line of the front face obtained from these two reading means, and a rear face, to establish a means to change separately the reading resolution of the two above-mentioned reading means further, respectively, and to change the above-mentioned resolution The image data obtained from the reading means set as the low resolution, and the image data obtained from the reading means set as high resolution When it compounds with the above-mentioned synthetic means, the gear-tooth omission part of the image data obtained from the reading means set as the above-mentioned low resolution By having established a means to interpolate by the image data in front of one line obtained from the same reading means When the resolution of reading of a front face and a rear face is the same, or even when it differs, always A front face, Image data on the back is compounded for every line, and it becomes possible to send to a coding means as 1 image data by the pair. In the coding means which encodes by making the data in front of one line of coding Rhine into reference Rhine, the image reader which made possible the optimal read for the image of a front face and each rear face can be realized very advantageous in respect of compressibility.
[0037] Next, the 2nd example of this invention is explained based on drawing 6 .
[0038] Also in this example, like the 1st example, the image of a front face and a rear face is read by the CCD unit 3 for front faces, and the CCD unit 4 for rear faces, respectively, and the image data of a front face and a rear face is compounded by turns for every line by the synthetic circuit 7, and it generates by one read operation of a manuscript as data which can be treated as 1 image data by the pair. And the data is changed into digital value with A/D converter 8.
[0039] Next, the binary-ized circuit 13 is constituted by two or more binary-ized circuits of simple binary-ized circuit 13a, dithering circuit 13b, and error diffusion-process circuit 13c.
[0040] When making the data of a manuscript with halftone binary in recent years, error diffusion-process circuit 13c here By changing to the conventional dithering and diffusing the binary-ized error

which is the binary-ized processing circuit which has come to be widely used by facsimile etc., and is generated at the time of binary-izing in an unsettled pixel It is the high definition binary-ized technique of saving the concentration of an image globally, and compared with the formation of simple binary, or dithering, it is hard to produce a moire phenomenon and gradation nature is also excellent.
[0041] Drawing 7 is the explanatory view showing basic actuation of error diffusion process.
[0042] In drawing 7 , * is an attention pixel and a is an error diffusion mask. In error diffusion process, when processing an attention pixel, frame processing in which the error of binary-izing is diffused to the data in the mask a set as the unsettled field which will process from now on is performed. therefore, when the image data of a front face and a rear face is compounded by turns for every line and inputted into a binary-ized processing circuit as one continuous image data by the both-sides pair like this example The formation of simple binary, and binary-ization by Rhine processing like dithering In binary-ization which carries out to all the image data that the pair followed without distinction of a table and a flesh side, and needs frame processing like error diffusion process Although it is near the boundary of a front face and a rear face, for example, an attention pixel is surface data Since the fault of diffusing an error to data on the back arises, the effective section signal of the manuscript side where the binary-ized processing was chosen is inputted from the reading control circuit 15 to a processing circuit.
[0043] As shown in drawing 8 , when gradation nature is shown in a front face and it reads a manuscript which only an alphabetic character image occupies in a rear face, for example, by the operator When error diffusion process is chosen as a front face and simple binary-ized processing is chosen as a rear face, in the binary-ized processing circuit 13 Since the continuation image data from which the image data of the front face and rear face of a manuscript was compounded by turns for every line, and became a pair is inputted, simple binary-ized processing of the Rhine processing is performed to the data of continuous both sides irrespective of a front face and a rear face.
[0044] On the other hand, if error diffusion process which performs frame processing is processed as it is to the continuation image data which the image data of a front face and a rear face was compounded by turns for every line, and became a pair, in order to disregard the boundary of the image data of a front face and a rear face and to perform binary-ized processing, as shown in drawing 8 , the surface effective section signal with which error diffusion process was chosen only for a front face to be made to process will be inputted from the reading control circuit 15.
[0045] As mentioned above, by the selector 22, again, the surface image data for one line and the image data on the back for one line are compounded by turns by the respectively separate binary-ized processing circuit 13, and are generated by the image data to which binary-ization was performed at the image data which the pair followed.
[0046] As shown in drawing 8 , the continuous image data to which simple binary-ized processing was performed for error diffusion process to the image on the back by an operator's selection to the surface image is compounded by the selector 22.
[0047] As mentioned above, the continuation image data from which the optimal binary-ized processing for the front face of a manuscript and a rear face was performed, and one line of a front face and a rear face became a pair is sent to a coding network 17 as one image.
[0048] In a coding network 17, since the image data in every line of the front face and rear face of the same manuscript is compounded, it is dealt with as continuation image data of a pair like the 1st example of the above and the correlation of Hazama with the image data in front of one is held, compressibility can be raised at the time of compression coding.
[0049] As explained above, in this 2nd example, two read means to read the front face and rear face of a manuscript, respectively are established. A means to compound by turns the image data in every line of the front face obtained from 2 read means and a rear face is established. As opposed to the image data of the front face of the image data which established two or more kinds of binary-ized processing means, and was compounded for every line of a front face and a rear face, and each rear face By having established said means to choose and process two or more respectively separate 2 status-ized processing means out of the binary-ized processing means of a class Even when carrying out processing which is different even when the binary-ized processing means against the image data of a front face and a rear

face carries out the same processing, the image data of a front face and a rear face is always compounded for every line. By the pair as one continuous image data It becomes possible to send to a coding means, and the image reader which made possible the optimal read for each image of a front face and a rear face can be realized very advantageous in respect of compressibility in the coding means which encodes with reference to the data in front of one line of coding Rhine.

[0050] In addition, it is also possible to double and constitute binary-ized mode of processing of the 2nd example of the above and resolution processing of the 1st example of the above as a pretreatment means of image data.

[0051] Furthermore, the means same with having explained above can realize to process image-processing filters, such as gamma amendment, according to an individual to the front face and rear face of a manuscript.

[0052]

[Effect of the Invention] As explained above, according to this invention, by one read actuation Even when reading the manuscript with which the distribution frequency of the image kinds of data (alphabetic data, gradation data, multi-edge data, etc.) of a front face and a rear face is greatly different As the optimal resolution for each field, and continuation image data from which it became possible from which to choose binary-ized processing, and the image data of a front face and a rear face became a pair the whole line, since compression coding is performed Since the correlation of coding Rhine which becomes important by the run-length-coding method, and reference Rhine in front of one of them is held, improvement in coding compressibility can be aimed at, and a manuscript image can be read so that playback image quality and the conditions of both amounts of data may be satisfied.

[0053] Moreover, without preparing the image frame memory for storing temporarily which of a front face or a rear face, or the image data for one side, in order to establish neither resolution nor two means of binary-ized processing or coding with the object for front faces, and the object for rear faces and to gather compressibility, it becomes possible to acquire the same effectiveness and becomes advantageous also in respect of the miniaturization of cost and equipment.

[0054] When memorizing a manuscript as an image file to media, such as an optical disk, especially, the image data of the front face of a manuscript and a rear face can be made into a pair, and the optimal pretreatment means for each field can be carried out, coding compressibility can be raised further, and the image reader to which the playback image quality and the conditions of both amounts of data which can be outputted to a storage are satisfied by one read actuation can be offered.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the 1st example of this invention.
[Drawing 2] In the 1st example of the above, it is the timing chart which shows actuation of CCD in the case of changing resolution.
[Drawing 3] In the 1st example of the above, it is the timing chart which shows the synthetic output wave in the case of changing the resolution of a front flesh side.
[Drawing 4] In the 1st example of the above, it is the timing chart which shows the image data wave inputted into the coding means in the case of changing the resolution of a front flesh side.
[Drawing 5] In the 1st example of the above, it is an explanatory view explaining the situation of compression coding at the time of compounding a front flesh side to one pair of continuous data.
[Drawing 6] It is the block diagram showing the 2nd example of this invention.
[Drawing 7] It is an explanatory view explaining the error diffusion process which is one of the binary-ized methods in the 2nd example of the above.
[Drawing 8] It is the explanatory view showing the situation of a switch of the binary-ized method in the 2nd example of the above.
[Description of Notations]
1 -- Manuscript,
2 -- Conveyance roller,
3 -- CCD unit for front faces,
4 -- CCD unit for rear faces,
5 -- CCD drive circuit for front faces,
6 -- CCD drive circuit for rear faces,
7 -- Image merge circuit,
8 -- A/D converter
9 -- Selector,
10 -- Rhine memory,
12 22 -- Multiplexer,
13 -- Binary-ized circuit,
15 -- Reading control circuit,
16 -- Input means,
17 -- Coding network.

[Translation done.]

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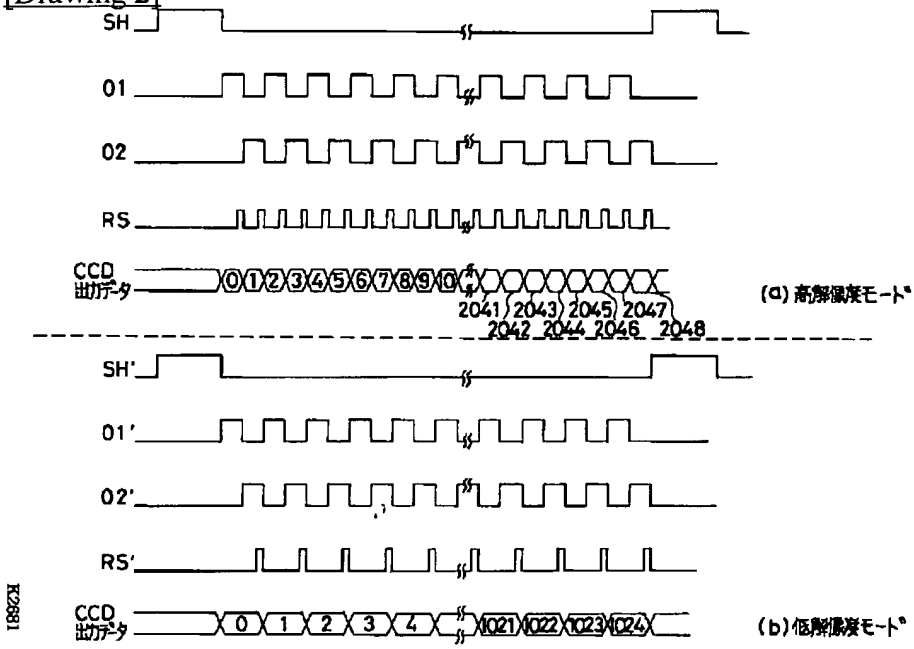
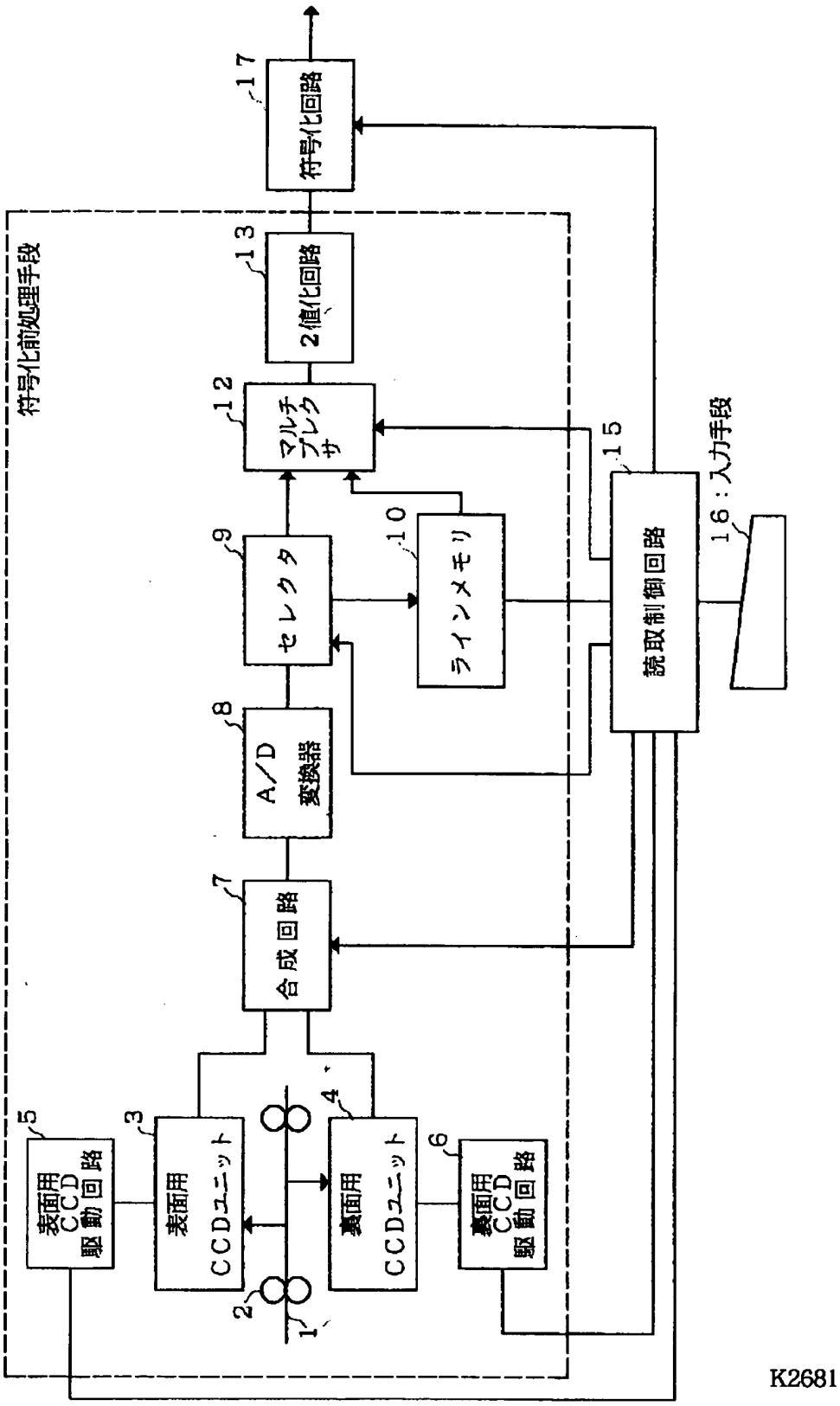
DRAWINGS

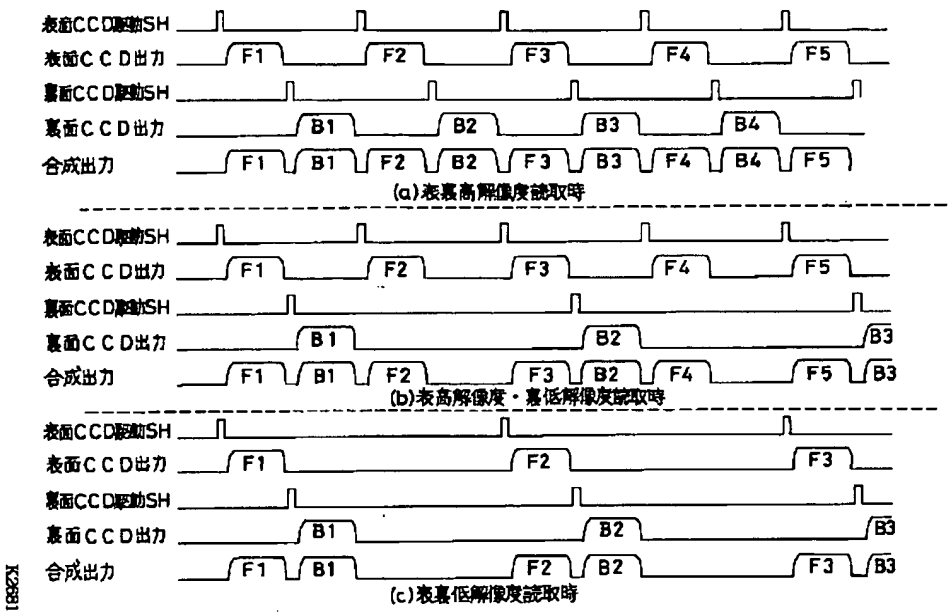
[Drawing 2]



[Drawing 1]

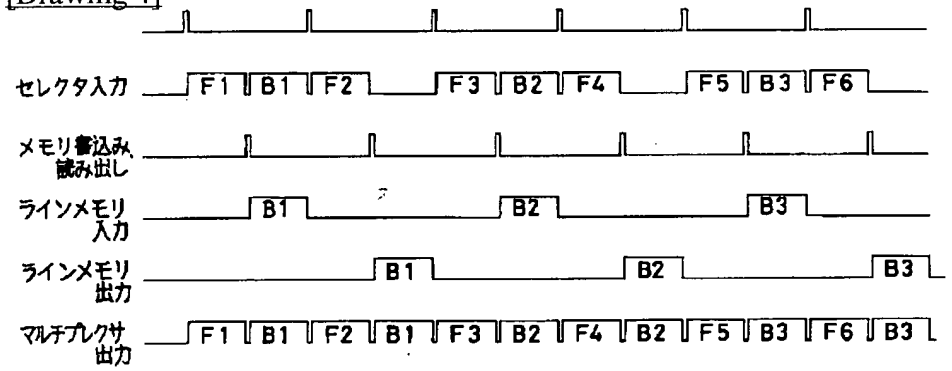

符号化前処理手段
17
符号化回路
13
2値化回路
12
マルチプレクサ
15
16：入力手段
9
セレクタ
10
ラインメモリ
読取制御回路
8
A/D変換器
7
合成回路
5
表面用CCD駆動回路
3
表面用CCDユニット
4
裏面用CCDユニット
6
裏面用CCD駆動回路
2
1
K2681

[Drawing 3]



K2881

[Drawing 4]



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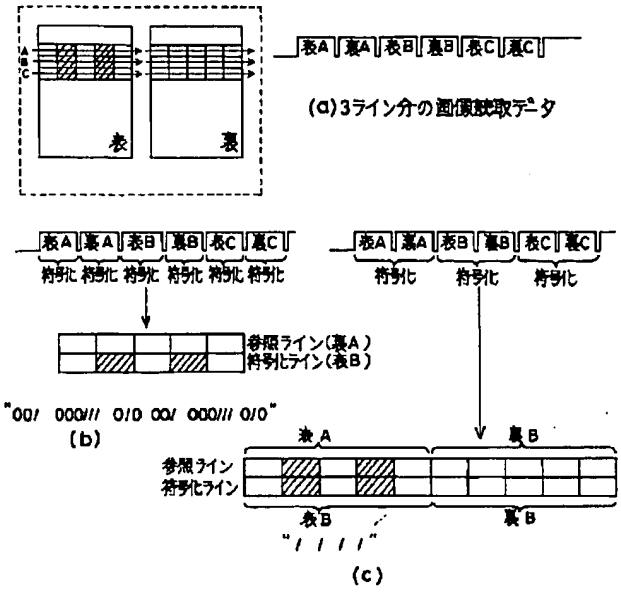
[Drawing 5]



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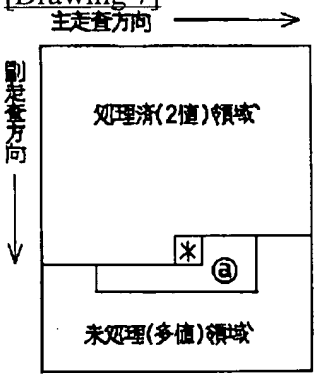
[Drawing 7]



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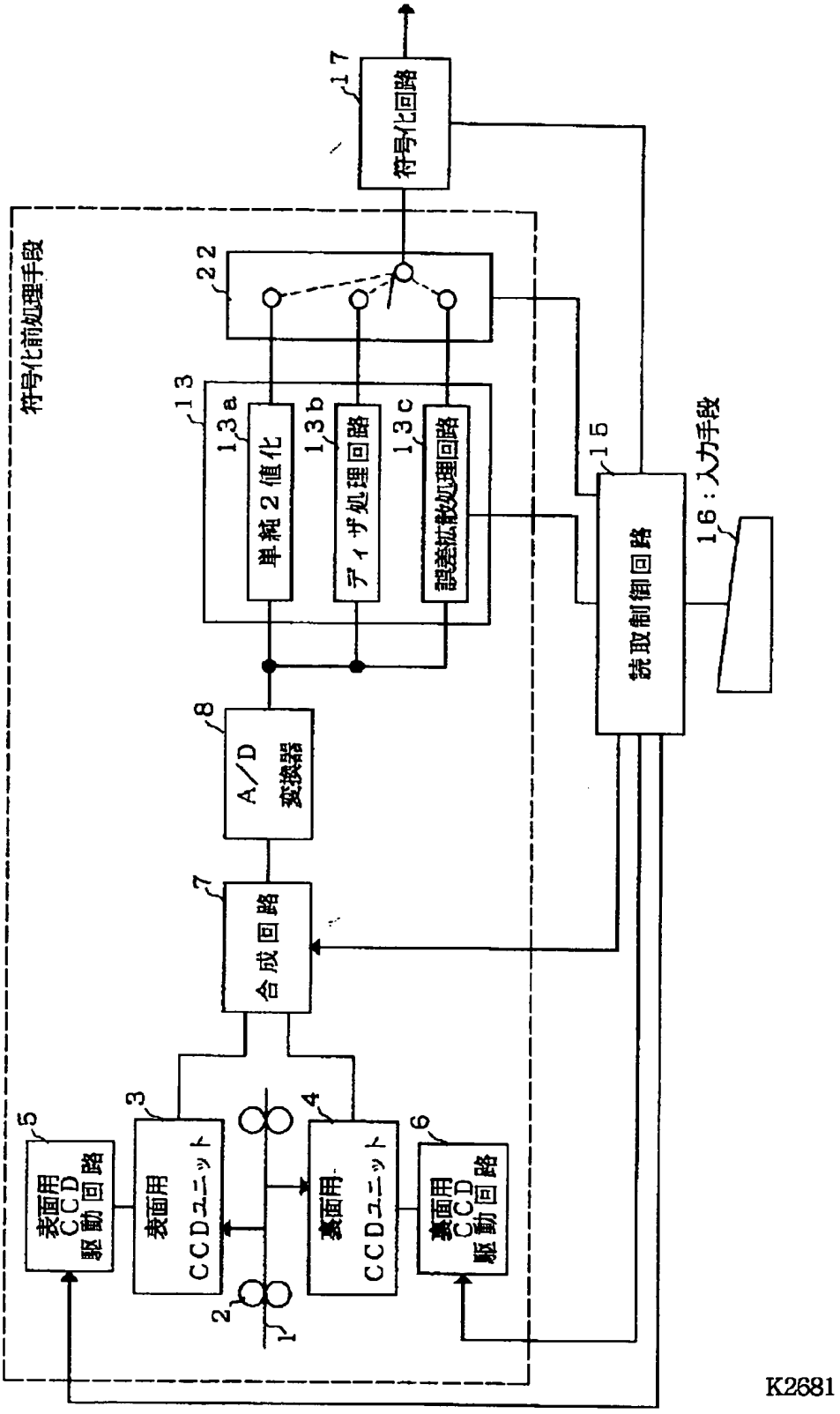
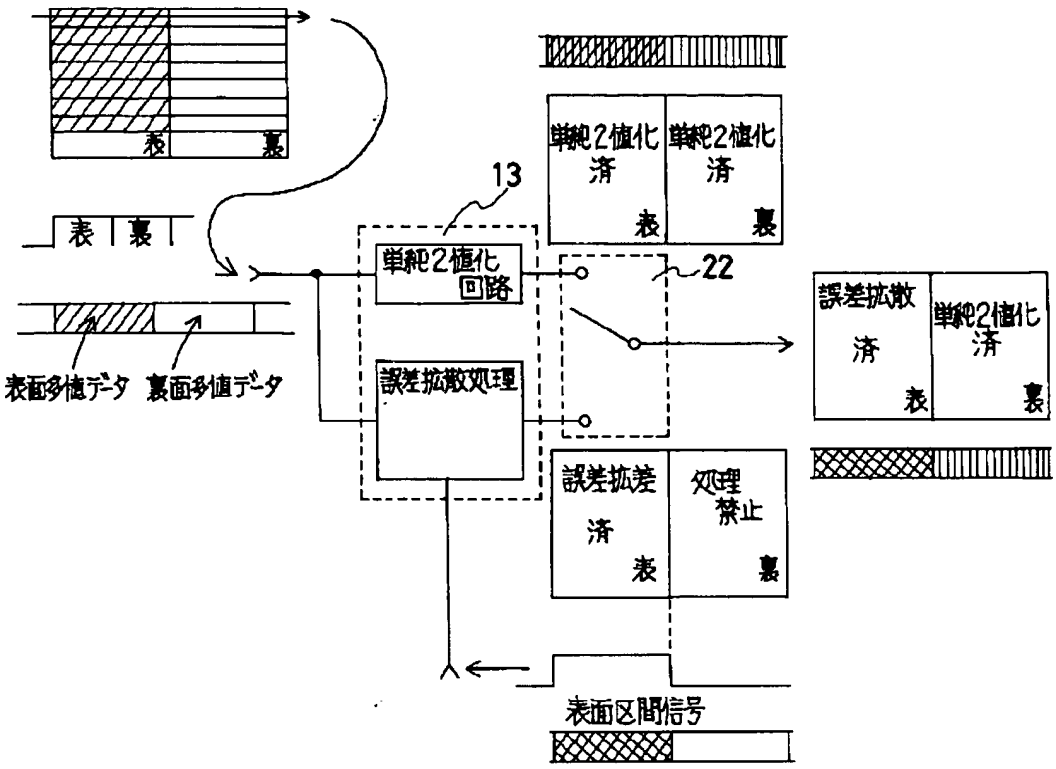
[Drawing 6]


符号化前処理手段
17
符号化回路
22
13
13a
単純2値化
13b
ディザ処理回路
13c
誤差拡散処理回路
15
読取制御回路
16：入力手段
8
A／D
変換器
7
合成回路
5
表面用
CCD
駆動回路
3
表面用
CCDユニット
4
裏面用
CCDユニット
6
裏面用
CCD
駆動回路
2
1
K2681

[Drawing 8]



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[Translation done.]

correlation in present Rhine, the amount of signs can be reduced appropriately, and air time can be shortened.

[0107] It faces according to the facsimile apparatus of invention according to claim 4, taking out the image data of every one line from a surface reading means and a rear-face reading means by turns, and carrying out compression coding with a predetermined algebraic-sign-ized method. About Rhine before present Rhine which is carrying out current coding Since the reference pixel at the time of compression coding is chosen at intervals of a line, also when carrying out compression coding with an algebraic-sign-ized method, it can encode referring to only a pixel with correlation, the amount of signs can be reduced appropriately, and air time can be shortened.

[0108] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the facsimile apparatus of invention according to claim 5 Decrypt the image data concerned, take out one line at a time by turns, reconfigurate as surface image data and image data on the back, and since a record output is carried out The image data of the front face of a double-sided manuscript and image data on the back can reproduce appropriately the image data by which compression coding was carried out for every line, and can carry out a record output as a surface image and a rear-face image.

[0109] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the facsimile apparatus of invention according to claim 6 While decrypting the image data concerned, taking out one line at a time by turns, reconfigurating the 1st image data for 1 page by the image data in every other line and carrying out a record output Since the 2nd image data will be decrypted again and a record output will be carried out if the record output of the 1st image data is completed after compressing again other image data in every other line and memorizing for a storage means as the 2nd image data for 1 page The image data of the front face of a double-sided manuscript and image data on the back can reproduce appropriately the image data by which compression coding was carried out for every line, reducing memory space. The facsimile apparatus which can carry out a record output as a surface image and a rear-face image can be made still cheaper.

[0110] It faces that the image data of the front face of a double-sided manuscript and image data on the back decrypt the image data in which compression coding was carried out by predetermined two dimensional coding for every line according to the facsimile apparatus of invention according to claim 7. Since beforehand Rhine in present decryption Rhine decrypted now is referred to, also when decrypting the image data in which compression coding was carried out by two dimensional coding, it can decode referring to Rhine which has correlation in present Rhine, and image data can be reproduced appropriately.

[0111] It faces that the image data of the front face of a double-sided manuscript and image data on the back decrypt the image data by which compression coding was carried out with the predetermined algebraic-sign-ized method for every line according to the facsimile apparatus of invention according to claim 8. About Rhine before present decryption Rhine which is carrying out the current decryption Since the reference pixel at the time of a decryption is chosen at intervals of a line, also when decrypting the image data by which compression coding was carried out with the algebraic-sign-ized method, it can decode referring to only a pixel with correlation, and image data can be reproduced appropriately.

[0112] If the image data of the front face of a double-sided manuscript and image data on the back receive the image data by which compression coding was carried out for every line according to the facsimile apparatus of invention according to claim 9 Arrange the image data for two lines which decrypt the image data concerned and continue lining up side-by-side, reconfigurate an image, and since a record output is carried out The record output of a surface image and the rear-face image can be carried out with an easy configuration, without being able to arrange the image data of the front face of a double-sided manuscript, and image data on the back in one sheet of recording paper, being able to carry out a record output, and using a special storage means. Therefore, facsimile apparatus can be made still cheaper.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The important section circuit block block diagram of the facsimile apparatus which applied the gestalt of operation of the 1st of the facsimile apparatus of this invention.
[Drawing 2] The plan of the front face and rear face of a double-sided manuscript read by the facsimile apparatus of drawing 1 .
[Drawing 3] Drawing showing the synthetic image data compressed by the compression coding section of the facsimile apparatus of drawing 1 .
[Drawing 4] Drawing showing the relation between usual coding Rhine in two dimensional coding, and reference Rhine, and the relation between coding Rhine in the gestalt of this operation, and reference Rhine.
[Drawing 5] Drawing showing an example of the template in an example of the usual template in an algebraic-sign-ized method, and the gestalt of this operation.
[Drawing 6] The important section circuit block block diagram of the facsimile apparatus which applied the gestalt of operation of the 2nd of the facsimile apparatus of this invention.
[Drawing 7] The important section circuit block block diagram of the facsimile apparatus which applied the gestalt of operation of the 3rd of the facsimile apparatus of this invention.
[Drawing 8] The important section circuit block block diagram of the facsimile apparatus which applied the gestalt of operation of the 4th of the facsimile apparatus of this invention.
[Drawing 9] The plan of the recording paper in which the condition of having carried out the record output of the front face and rear face of a double-sided manuscript at one sheet of recording paper is shown.
[Drawing 10] The circuit block diagram of the conventional facsimile apparatus.
[Description of Notations]
1, 20, 30, 40 Facsimile apparatus
2 Surface Read Station
3 Rear-Face Read Station
4 Selection Section
5 Compression Coding Section
6 Transmitting Section
7 Double-sided Manuscript
7a Front face
7b Rear face
8 Synthetic Image Data
8a Surface image Rhine data
8b Rear-face image Rhine data
10a Coding Rhine
10b Front Rhine
10c Beforehand Rhine

11a, 12a Pixel
11b, 12b Present coding Rhine
11c, 12c Before Rhine
11d Beforehand Rhine
12d Rhine in front of two
12e Rhine in front of three
12f Rhine in front of four
21 Memory Section
22 Selection Section
23 Compression Coding Section
24 Decryption Section
25 Coding Section
31 Receive Section
32 Decryption Section
33 Selection Section
34 Output Section
35 Change-over Section
36 37 Memory
41 Selection Section
42 Compression Coding Section
43 Memory Section
44 Change-over Section
45 46 Memory

[Translation done.]